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【102】Spin wave modes in Permalloy micro stripes using time-resolved scanning transmission X-ray microscopy

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Micro-resonators fabricated by optical lithography can be combined with scanning transmission x-ray microscope (STXM) and a time-resolved detection scheme to measure magnetic excitations in ferromagnetic resonance (FMR) with ultimate spatio-temporal resolution of nominally 35 nm and a snapshot detection down to 17.4 ps [1]. Two perpendicular Permalloy micro-stripes were fabricated using e-beam lithography and pre-characterized using conventional FMR. The dynamic magnetic contrast measured by STXM-FMR enable to directly observe both uniform FMR modes as well as inhomogeneous spin-wave modes which exhibit a remarkably good agreement with respective micro-magnetic simulations. Moreover the properties of the spin-waves can be modified via the mutual positioning of the two Py stripes.
[1] T. Schaffers et al., Rev. Sci. Instrum. 88, 093703 (2017)

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